

1/41

SEQUENCE LISTING

<110> Alexion Pharmaceuticals, Inc.  
Rother, Russell P.  
Faas-Knight, Susan  
Wu, Dayang  
Carr, Francis J.  
Hamilton, Anita

<120> DE-IMMUNIZED ANTI-CD3 ANTIBODY

<130> 106 PCT (1087-59 PCT)

<140> PCT/US2004/017219

<141> 2004-05-28

<150> US 60/475,155

<151> 2003-06-02

<160> 83

<170> PatentIn version 3.2

<210> 1  
<211> 819  
<212> DNA  
<213> murine

<400> 1  
aagcttatga atatgcaa at cctctgaatc tacatggtaa' atataggttt gtctatacca 60  
caaacagaaa aacatgagat cacagttctc tctacagtta ctgagcacac aggacctcac 120  
catgggatgg agctgtatca tcctcttctt ggtagcaaca gctacaggta aggggctcac 180  
agtagcaggc ttgaggtctg gacatatata tgggtgacaa tgacatccac tttgcctttc 240  
tctccacagg tgtccactcc caggtccagc tgcaacagtc tggggctgaa ctgcgaagac 300  
ctggggcctc agtgaagatg tcctgcaagg cttctggcta cacgtttact aggtacacga 360  
tgcaactgggt aaaacagagg cctggacaag gtttggaatg gattggatac attaaccccta 420  
gccgtggata tactaattac aatcagaagt tcaaggacaa ggccacactg actacagaca 480  
aatcttccag cacagcctac atgcaactga gcagcctgac atctgaggac tccgcagtct 540  
attactgtgc aagatattat gatgatcatt actgtctcga ctactggggc caaggcacca 600  
ctttgacagt ctctcaggt gagtccttac aacctctctc ttctattcag cttaaataga 660  
ttttactgca tttgttgggg gggaaatgtg tgtatctgaa tttcagggtca tgaaggacta 720  
gggacacctt gggagtcaga aagggtcatt gggagcccg gctgatgcag acagacatcc 780  
tcagctccca gacttcatgg ccagagattt ataggatcc 819

<210> 2

<211> 15  
 <212> PRT  
 <213> murine

<400> 2

Met	Gly	Trp	Ser	Cys	Ile	Ile	Leu	Phe	Leu	Val	Ala	Thr	Ala	Thr
1				5					10					15

<210> 3  
 <211> 617  
 <212> DNA  
 <213> murine

<400> 3

aagcttatga	atatgcaaat	cctctgaatc	tacatggtaa	atataggttt	gtctatacca	60
caaacagaaa	aacatgagat	cacagttctc	tctacagtta	ctgagcacac	aggacctcac	120
catgggatgg	agctgtatca	tcctcttctt	ggtagcaaca	gctacaggta	aggggctcac	180
agtagcaggc	ttgaggtctg	gacatatata	tgggtgacaa	tgacatccac	tttgcctttc	240
tctccacagg	tgtccactcc	caaattgttc	tcaccagctc	tccagcaatc	atgtctgcat	300
ctccagggga	aaaggtcacc	atgacatgca	gtgccagctc	aagtgtaagt	tacatgaact	360
ggtaccagca	gaagtcaggc	acctccccca	aaagatggat	ttatgacaca	tcaaaaactgg	420
cttctggagt	accggctcac	ttcaggggca	gtgggtctgg	gacctcttac	tctctcacia	480
tctcagggat	ggaagctgaa	gatgccgcaa	cttattactg	ccagcagtgg	tcaagtaacc	540
cattcacgtt	cggatctggt	acaaagttgg	aatcaaacg	tgagtagaat	ttaaactttg	600
cttcctcagt	tgatcc					617

<210> 4  
 <211> 15  
 <212> PRT  
 <213> murine

<400> 4

Met	Gly	Trp	Ser	Cys	Ile	Ile	Leu	Phe	Leu	Val	Ala	Thr	Ala	Thr
1				5					10					15

<210> 5  
 <211> 6058  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> vector

<400> 5

acgcgttgac attgattatt gactagttat taatagtaat caattacggg gtcattagtt	60
catagcccat atatggagtt ccgcgttaca taacttacgg taaatggccc cgcttggtg	120
accgcccac gacccccgcc cattgacgtc aataatgacg tatgttccca tagtaacgcc	180
aatagggact ttccattgac gtcaatgggt ggactattta cggtaaactg cccacttggc	240
agtacatcaa gtgtatcata tgccaagtac gccccctatt gacgtcaatg acggtaaagt	300
gcccgcctgg cattatgccc agtacatgac cttatgggac tttcctactt ggcagtacat	360
ctacgtatta gtcacgcta ttaccatggt gatgcggttt tggcagtaca tcaatgggcg	420
tggatagcgg tttgactcac ggggatttcc aagtctccac ccattgacg tcaatgggag	480
tttgttttg caccaaaatc aacgggactt tccaaaatgt cgtaacaact ccgccccatt	540
gacgcaaatg ggcggtaggc gtgtacggtg ggaggtctat ataagcagag ctcgtttagt	600
gaaccgtcag aattctgttg ggctcgcggt tgattacaaa ctcttcgcgg tctttccagt	660
actcttgat cggaacccg tcggcctccg aacggtactc cgccaccgag ggacctgagc	720
gagtccgcat cgaccggatc ggaaaacctc tcgactgttg gggtgagtac tccctctcaa	780
aagcgggcat gacttctgcg ctaagattgt cagtttccaa aaacgaggag gatttgatat	840
tcacctggcc cgcggtgatg cctttgaggg tggcgcgctc catctggtca gaaaagacaa	900
tctttttgtt gtcaagcttg aggtgtggca ggcttgagat ctggccatac acttgagtga	960
caatgacatc cactttgcct ttctctccac aggtgtccac tcccaggtec aactgcagg	1020
cgaccggctt ggtaccgagc tcggatccgg accatcatga agtggagctg ggttattctc	1080
ttcctcctgt cagtaactgc cggcgtccac tcccaggttc aggtccagca gtctggggct	1140
gagctggcaa gaccttgggc ttcagtgaag ttgtcctgca aggtctctgg ctacaatttt	1200
aatagttact ggatgcagtg ggtaaaacag aggcctggac agggctctgga atggattggg	1260
gctattttatc ctggagatgg tgatactagc tacactcaga agttcagggg caaggccaca	1320
ttgactgcag ataaatcctc cagcacagcc tacatgcaac tcagcagctt ggcattctgag	1380
gactctgcgg tctattactg tgcaagacgt acggtaggag gctactttga ctactggggc	1440
caaggcacca ctctcacagt ctctcagcc tccaccaagg gcccatccgt cttccccctg	1500
gcgccttgc ccaggagcac ctccgagagc acagccgccc tgggctgcct ggtcaaggac	1560
tacttccccg aaccggtgac ggtgtcgtgg aactcaggcg cctgaccag cggcgtgcac	1620
accttccccg ctgtcctaca gtctcagga ctctactccc tcagcagcgt ggtgaccgtg	1680
ccctccagca gcttgggcac gaagacctac acctgcaacg tagatcacia gccagcaac	1740
accaaggtgg acaagagagt tggtagagg ccagcacagg gagggagggt gtctgctgga	1800

agccaggctc	agccctcctg	cctggacgca	ccccggctgt	gcagccccag	cccagggcag	1860
caaggcatgc	cccatctgtc	tcctcacccg	gaggcctctg	accaccccac	tcattgctcag	1920
ggagaggggc	ttctggattt	ttccaccagg	ctcccggcac	cacaggctgg	atgcccctac	1980
cccaggccct	gcgcatacag	ggcagggtgt	gcgctcagac	ctgccaagag	ccatatccgg	2040
gaggaccctg	cccctgacct	aagcccaccc	caaaggccaa	actctccact	ccctcagctc	2100
agacaccttc	tctcctccca	gatctgagta	actcccaatc	ttctctctgc	agagtccaaa	2160
tatgggtccc	catgcccata	atgcccagg	aagccaaccc	aggcctcgcc	ctccagctca	2220
aggcgggaca	ggtgccttag	agtagcctgc	atccagggac	aggccccagc	cgggtgtgta	2280
cgcattccacc	tccattctct	cctcagcacc	tgagttcctg	gggggacctt	cagtcttctt	2340
gttcccccca	aaaccaagg	acactctcat	gatctcccgg	accctgagg	tcacgtgcgt	2400
ggtggtggac	gtgagccagg	aagacccgca	ggtccagttc	aactggtacg	tggatggcgt	2460
ggaggtgcat	aatgccaaga	caaagccgcg	ggaggagcag	ttcaacagca	cgtaccgtgt	2520
ggtcagcgtc	ctcaccgtcc	tgcaccagga	ctggctgaac	ggcaaggagt	acaagtgcaa	2580
ggtctccaac	aaaggcctcc	cgtcctccat	cgagaaaacc	atctccaaag	ccaaagggtg	2640
gaccacggg	gtgcgagggc	cacacggaca	gaggccagct	cggccccacc	tctgccctgg	2700
gagtgaccgc	tgtgccaacc	tctgtcccta	cagggcagcc	cagagagcca	cagggtgtaca	2760
ccctgcccc	atcccaggag	gagatgacca	agaaccagg	cagcctgacc	tgctgtgtca	2820
aaggcttcta	ccccagcgac	atcgccgtgg	agtgggagag	caatgggcag	ccggagaaca	2880
actacaagac	cacgcctccc	gtgctggact	ccgacggctc	cttcttcttc	tacagcaggc	2940
taaccgtgga	'caagagcagg	tggcaggagg	ggaatgtctt	ctcatgctcc	gtgatgcatg	3000
aggctctgca	caaccactac	acacagaaga	gcctctccct	gtctctgggt	aaatgagtgc	3060
cagggccggc	aagccccgc	tccccatcca	tcacactggc	ggccgctcga	gcatgcatct	3120
agaacttggt	tattgcagct	tataatgggt	acaaataaag	caatagcatc	acaaatttca	3180
caaataaagc	atTTTTTTTca	ctgcattcta	gttgtggttt	gtccaaactc	atcaatgtat	3240
cttatcatgt	ctggatcgat	cccgccatgg	tatcaacgcc	atatttctat	ttacagtagg	3300
gacctcttcg	ttgtgtaggt	accgtgttat	tcctagggaa	atagtagagg	caccttgaac	3360
tgtctgcata	agccatatag	cccccgctgt	tcgacttaca	aacacaggca	cagtactgac	3420
aaaccatac	acctcctctg	aaatacccat	agttgctagg	gctgtctccg	aactcattac	3480
acctccaaa	gtcagagctg	taatttcgcc	atcaagggca	gcgagggtct	ctccagataa	3540
aatagcttct	gcgagaggtc	ccgtaagggt	agacacttca	gctaattcct	cgatgagggtc	3600

tactagaata gtcagtgcgg ctcccatttt gaaaattcac ttacttgatc agcttcagaa	3660
gatggcggag ggcctccaac acagtaattt tcttcccgac tcttaaaata gaaaatgtca	3720
agtcagttaa gcaggaagtg gactaactga cgcagctggc cgtgcgacat cctcttttaa	3780
ttagttgcta ggcaacgccc tccagagggc gtgtggtttt gcaagaggaa gcaaaagcct	3840
ctccaccag gcctagaatg tttccacca atcattacta tgacaacagc tgtttttttt	3900
agtattaagc agaggccggg gaccctggg cccgcttact ctggagaaaa agaagagagg	3960
cattgtagag gcttccagag gcaacttgtc aaaacaggag tgcttctatt tctgtcacac	4020
tgtctggccc tgtcacaagg tccagcacct ccataccccc ttttaataagc agtttgggaa	4080
cgggtgcggg tcttactccg cccatccgc ccctaactcc gccagttcc gccattctc	4140
cgcccatgg ctgactaatt ttttttattt atgcagagggc cgaggccgcc tcggcctctg	4200
agctattcca gaagtagtga ggaggctttt ttggaggcct aggcctttgc aaaaaggagc	4260
tcccagcaaa aggccaggaa ccgtaaaaag gccgccttgc tggcgttttt ccataggctc	4320
cgccccctg acgagcatca caaaaatcga cgctcaagtc agagggtggcg aaacccgaca	4380
ggactataaa gataccaggc gtttccccct ggaagctccc tcgtgcgctc tctgttccg	4440
accctgccgc ttaccggata cctgtccgcc tttctccctt cgggaagcgt ggcgctttct	4500
caatgctcac gctgtaggta tctcagttcg gtgtaggtcg ttcgctccaa gctgggctgt	4560
gtgcacgaac ccccgttca gcccgaccgc tgcgccttat ccggtaacta tcgtcttgag	4620
tccaaccgg taagacacga cttatcgcca ctggcagcag ccactggtaa caggattagc	4680
agagcgaggt atgtaggcgg tgctacagag ttcttgaagt ggtggcctaa ctacggctac	4740
actagaagga cagtatttgg tatctgcgct ctgctgaagc cagttacctt cggaaaaaga	4800
gttggtagct cttgatccgg caaacaacc accgctggta gcggtggttt ttttgtttgc	4860
aagcagcaga ttacgcgcag aaaaaaagga tctcaagaag atcctttgat cttttctacg	4920
gggtctgacg ctcagtggaa cgaaaactca cgttaaggga ttttggtcac gagattatca	4980
aaaaggatct tcacctagat ctttttaaat taaaaatgaa gttttaaatc aatctaaagt	5040
atatatgagt aaacttggtc tgacagttac caatgcttaa tcagtgaggc acctatctca	5100
gcgatctgtc tatttcgttc atccatagtt gcctgactcc ccgtcgtgta gataactacg	5160
atacgggagg gcttaccatc tggccccagt gctgcaatga taccgcgaga cccacgctca	5220
ccggctccag atttatcagc aataaaccag ccagccggaa gggccgagcg cagaagtggc	5280
cctgcaactt tatccgcctc catccagtct attaattggt gccgggaagc tagagtaagt	5340
agttcgccag ttaatagttt gcgcaacggt gttgccattg ctacaggcat cgtgggtgtca	5400

```

cgctcgtcgt ttggtatggc ttcattcagc tccggttccc aacgatcaag gcgagttaca 5460
tgatcccccga tgttgtgcaa aaaagcgggt agctccttcg gtcctccgat cgttgtcaga 5520
agtaagttgg ccgcagtgtt atcactcatg gttatggcag cactgcataa ttctcttact 5580
gtcatgccat ccgtaagatg cttttctgtg actggtgagt actcaaccaa gtcattctga 5640
gaatagtgtg tgcggcgacc gagttgctct tgcccggcgt caatacggga taataccgcg 5700
ccacatagca gaactttaaa agtgctcatc attggaaaac gttcttcggg gcgaaaactc 5760
tcaaggatct taccgctgtt gagatccagt tcgatgtaac ccactcgtgc acccaactga 5820
tcttcagcat cttttacttt caccagcgtt tctgggtgag caaaaacagg aaggcaaaat 5880
gccgcaaaaa aggggaataag ggcgacacgg aaatgttgaa tactcatact cttccttttt 5940
caatattatt gaagcattta tcaggggttat tgtctcatga gcggatacat atttgaatgt 6000
atttagaaaa ataaacaaat aggggttccg cgcacatttc cccgaaaagt gccacctg 6058

```

```

<210> 6
<211> 235
<212> PRT
<213> human

```

```

<400> 6

```

```

Met Lys Trp Ser Trp Val Ile Leu Phe Leu Leu Ser Val Thr Ala Gly
1           5           10          15

```

```

Val His Ser Gln Val Gln Val Gln Gln Ser Gly Ala Glu Leu Ala Arg
          20          25          30

```

```

Pro Trp Ala Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Asn Phe
          35          40          45

```

```

Asn Ser Tyr Trp Met Gln Trp Val Lys Gln Arg Pro Gly Gln Gly Leu
50          55          60

```

```

Glu Trp Ile Gly Ala Ile Tyr Pro Gly Asp Gly Asp Thr Ser Tyr Thr
65          70          75          80

```

```

Gln Lys Phe Arg Gly Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser
          85          90          95

```

```

Thr Ala Tyr Met Gln Leu Ser Ser Leu Ala Ser Glu Asp Ser Ala Val
          100          105          110

```

Tyr Tyr Cys Ala Arg Arg Thr Val Gly Gly Tyr Phe Asp Tyr Trp Gly  
 115 120 125

Gln Gly Thr Thr Leu Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser  
 130 135 140

Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala  
 145 150 155 160

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val  
 165 170 175

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala  
 180 185 190

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val  
 195 200 205

Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp His  
 210 215 220

Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val  
 225 230 235

<210> 7  
 <211> 6057  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> vector

<400> 7  
 acgcgttgac attgattatt gactagttat taatagtaat caattacggg gtcattagtt 60  
 catagcccat atatggagtt ccgcgttaca taacttacgg taaatggccc cgcctggctg 120  
 accgccaac gacccccgcc cattgacgtc aataatgacg tatgttccca tagtaacgcc 180  
 aatagggact ttccattgac gtcaatgggt ggactattta cggtaaactg cccacttggc 240  
 agtacatcaa gtgtatcata tgccaagtac gccccctatt gacgtcaatg acggtaaagt 300  
 gcccgcctgg cattatgccc agtacatgac cttatgggac tttcctactt ggcagtacat 360  
 ctacgtatta gtcacgcta ttaccatggt gatgcgggtt tggcagtaca tcaatgggag 420  
 tggatagcgg ttgactcac ggggatttcc aagtctccac cccattgacg tcaatgggag 480  
 tttgttttgg caccaaaatc aacgggactt tccaaaatgt cgtaacaact ccgccccatt 540

gacgcaa	atg	ggcgg	taggc	gtgtac	ggtg	ggaggt	ctat	ataag	cagag	ctcgt	tttagt	600
gaaccg	tcag	aattct	gttg	ggctcg	cggt	tgattac	aaa	ctcttc	gcgg	tctttc	cagt	660
actctt	ggat	cggaa	acccg	tcggc	ctccg	aacggt	actc	cgccac	cagag	ggacct	gagc	720
gagtcc	gcat	cgacc	ggatc	ggaaa	acctc	tcgact	gttg	gggtg	agtac	tccctc	tcaa	780
aagcgg	gcat	gacttc	tgcg	ctaag	attgt	cagttt	tcaa	aaacg	aggag	gatttg	atat	840
tcacct	ggcc	cgcggt	gatg	cctttg	aggg	tggcc	gcgtc	catct	ggtca	gaaaag	acaa	900
tctttt	tgtt	gtcaag	cttg	aggtgt	ggca	ggcttg	agat	ctggc	catac	acttg	agtga	960
caatga	catc	cacttt	gcct	ttctct	ccac	aggtgt	ccac	tcccag	gtcc	aactgc	aggt	1020
cgaccg	gctt	ggtacc	gagc	tcggat	ccgg	accatc	atga	agtgg	agctg	ggttat	tctc	1080
ttcctc	cctgt	cagta	aactgc	cggcg	tccac	tcccag	gttc	aggtc	cagca	gtctg	gggct	1140
gagctg	gcaa	gacctt	gggc	ttcagt	gaag	ttgtct	gca	aggctt	cttg	ctaca	atttt	1200
aatagt	tact	ggatg	cagtg	ggtaaa	acag	aggcct	ggac	agggct	ctgga	atggat	tggg	1260
gctatt	tatc	ctggag	atgg	tgata	ctagc	tacact	caga	agttc	agggg	caaggc	caca	1320
ttgact	gcag	ataaat	cctc	cagcac	agcc	tacatg	caac	tcagc	agctt	ggcatc	tgag	1380
gactct	gcgg	tctatt	actg	tgcaag	acgt	acggta	ggag	gctact	ttga	ctactg	gggc	1440
caaggc	acca	ctctca	cagt	ctcctc	agcc	tccacca	aagg	gcccac	tcgt	cttcccc	ctg	1500
gcgcct	tgct	ccaggag	cac	ctccg	agagc	acagcc	gccc	tgggt	gcct	ggtca	aggac	1560
tacttc	ccccg	aaccg	gtgac	ggtgt	cgtg	aactc	aggcg	ccctg	accag	cggcg	tgac	1620
accttc	ccccg	ctgtc	ctaca	gtcctc	cagga	ctctac	tccc	tcagc	agcgt	ggtg	accgtg	1680
ccctcc	cagca	acttc	ggcac	ccagac	cctac	acctg	caacg	tagat	cacaa	gcccag	caac	1740
accaag	gtg	acaag	acagt	tgggt	gagag	ccagct	cagg	gaggg	aggg	gtctg	ctgga	1800
agccag	gctc	agccct	cctg	cctgg	acgca	ccccg	gctgt	gcagc	ccccag	cccagg	gcag	1860
caaggc	caggc	cccac	ctgtc	tcctc	acccg	gaggc	ctctg	cccgcc	ccac	tcatg	ctcag	1920
ggagag	gggtc	ttctg	gcttt	ttccac	cagg	ctccag	gcag	gcac	aggtg	ggtg	ccccta	1980
ccccag	gccc	ttcac	acaca	ggggc	aggtg	cttgg	ctcag	acctg	ccaaa	agccat	atcc	2040
gggagg	accc	tgccct	tgac	ctaag	ccgac	cccaa	aggcc	aaact	gtcca	ctccct	cagc	2100
tcggac	acct	tctctc	ctcc	cagat	ccgag	taact	cccaa	tcttc	ctctc	gcagag	cgca	2160
aatgtt	gtgt	cgagt	gccc	ccgtg	cccag	gtaag	ccagc	ccagg	cctcg	ccctcc	agct	2220
caaggc	ggga	caggt	gcct	agagt	agcct	gcac	ccaggg	acagg	cccca	gctgg	gtgt	2280
gacacg	tcca	cctcc	atctc	ttcctc	cagca	ccacct	gtgg	caggac	cgtc	agtctt	cctc	2340



ttccccccaa aacccaagga caccctcatg atctcccgga cccctgaggt cacgtgcgtg	2400
gtggtggacg tgagccagga agaccccgag gtccagttca actggtacgt ggatggcgtg	2460
gaggtgcata atgccaagac aaagccgcgg gaggagcagt tcaacagcac gtaccgtgtg	2520
gtcagcgtcc tcaccgtcct gcaccaggac tggctgaacg gcaaggagta caagtgcaag	2580
gtctccaaca aaggcctccc gtctccatc gagaaaacca tctccaaagc caaaggtggg	2640
accacggggg tgcgagggcc acacggacag aggccagctc ggcccaccct ctgccctggg	2700
agtgaccgct gtgccaacct ctgtccctac agggcagccc cgagagccac aggtgtacac	2760
cctgccccca tcccaggagg agatgaccaa gaaccaggtc agcctgacct gcctgggtcaa	2820
aggcttctac ccagcgcaca tcgccgtgga gtgggagagc aatgggcagc cggagaacaa	2880
ctacaagacc acgcctcccg tgctggactc cgacggctcc ttcttcctct acagcaggct	2940
aaccgtggac aagagcaggt ggcaggaggg gaatgtcttc tcatgctccg tgatgcatga	3000
ggctctgcac aaccactaca cacagaagag cctctccctg tctctgggta aatgagtgcc	3060
agggccggca agccccgct ccccatccat cacactggcg gccgctcgag catgcatcta	3120
gaacttgttt attgcagctt ataatgggtta caaataaagc aatagcatca caaatttcac	3180
aaataaagca tttttttcac tgcattctag ttgtggtttg tccaaactca tcaatgtatc	3240
ttatcatgtc tggatcgatc ccgccatggg atcaacgcc a ttttctatt tacagtaggg	3300
acctcttcgt tgtgtaggta ccgctgtatt cctagggaaa tagtagaggc accttgaact	3360
gtctgcatca gccatatagc ccccgctgtt cgacttacaa acacaggcac agtactgaca	3420
aaccataca cctcctctga aatacccata gttgctaggg ctgtctccga actcattaca	3480
ccctccaaag tcagagctgt aatttcgcc tcaagggcag cgagggcttc tccagataaa	3540
atagcttctg ccgagagtcc cgtaagggtg gacacttcag ctaatccctc gatgaggtct	3600
actagaatag tcagtgcggc tcccattttg aaaattcact tacttgatca gcttcagaag	3660
atggcggagg gcctccaaca cagtaatfff cctcccgact cttaaaatag aaaatgtcaa	3720
gtcagttaag caggaagtgg actaactgac gcagctggcc gtgcgacatc ctcttttaat	3780
tagttgctag gcaacgcctt ccagagggcg tgtggttttg caagaggaag caaaagcctc	3840
tccaccaggg cctagaatgt ttccacccaa tcattactat gacaacagct gtttttttta	3900
gtattaagca gaggcggggg acccctgggc ccgcttactc tggagaaaaa gaagagaggg	3960
attgtagagg cttccagagg caacttgtca aaacaggact gcttctatff ctgtcacact	4020
gtctggccct gtcacaaggt ccagcacctc cataccccct ttaataagca gtttgggaac	4080
gggtgcgggt cttactccgc ccatcccgcc cctaactccg cccagttccg cccattctcc	4140

gccccatggc	tgactaat	tttttatt	tgcagagg	gaggccgc	cggcctctga	4200
gctattccag	aagtagtgag	gaggcttttt	tggaggccta	ggcttttgca	aaaaggagct	4260
cccagcaaaa	ggccaggaac	cgtaaaaagg	ccgcgttgct	ggcgtttttc	cataggctcc	4320
gccccctga	cgagcatcac	aaaaatcgac	gctcaagtca	gaggtggcga	aaccgcacag	4380
gactataaag	ataccaggcg	tttccccctg	gaagctccct	cgtgcgctct	cctgttccga	4440
ccctgccgct	taccggatac	ctgtccgcct	ttctcccttc	gggaagcgtg	gcgctttctc	4500
aatgctcacg	ctgtaggtat	ctcagttcgg	tgtaggtcgt	tcgctccaag	ctgggctgtg	4560
tgcacgaacc	ccccgttcag	cccgaccgct	gcgccttata	cggtaactat	cgtcttgagt	4620
ccaacccggg	aagacacgac	ttatcgccac	tggcagcagc	cactggtaac	aggattagca	4680
gagcgaggta	tgtaggcggt	gctacagagt	tcttgaagtg	gtggcctaac	tacggctaca	4740
ctagaaggac	agtatttggt	atctgcgctc	tgctgaagcc	agttaccttc	ggaaaaagag	4800
ttggtagctc	ttgatccggc	aaacaaacca	ccgctggtag	cgggtggtttt	tttgtttgca	4860
agcagcagat	tacgcgcaga	aaaaaaggat	ctcaagaaga	tcctttgatc	ttttctacgg	4920
ggctctgacg	tcagtggaac	gaaaactcac	gttaagggat	tttgggtcatg	agattatcaa	4980
aaaggatctt	cacctagatc	cttttaaatt	aaaaatgaag	ttttaaatca	atctaaagta	5040
tatatgagta	aacttggtct	gacagttacc	aatgcttaat	cagtgaggca	cctatctcag	5100
cgatctgtct	atttcgttca	tccatagttg	cctgactccc	cgtcgtgtag	ataactacga	5160
tacgggaggg	cttaccatct	ggccccagtg	ctgcaatgat	accgcgagac	ccacgctcac	5220
cggctccaga	tttatcagca	ataaaccagc	cagccggaag	ggccgagcgc	agaagtggtc	5280
ctgcaacttt	atccgcctcc	atccagtcta	ttaattgttg	cggggaagct	agagtaagta	5340
gttcgccagt	taatagtttg	cgcaacgttg	ttgccattgc	tacaggcatc	gtggtgtcac	5400
gctcgtcggt	tggtaggtct	tcattcagct	ccggttccca	acgatcaagg	cgagttacat	5460
gatcccccat	gttgtgcaaa	aaagcgggta	gtcccttcgg	tcctccgatc	gttgtcagaa	5520
gtaagttggc	cgcagtgtta	tactcatggt	ttatggcagc	actgcataat	tctcttactg	5580
tcatgccatc	cgtaagatgc	ttttctgtga	ctggtagagta	ctcaaccaag	tcattctgag	5640
aatagtgtat	gcggcgaccg	agttgctctt	gcccggcgtc	aatacgggat	aataccgcgc	5700
cacatagcag	aactttaaaa	gtgctcatca	ttggaaaacg	ttcttcgggg	cgaaaactct	5760
caaggatctt	accgctgttg	agatccagtt	cgatgtaacc	cactcgtgca	cccaactgat	5820
cttcagcatc	ttttactttc	accagcgttt	ctgggtgagc	aaaaacagga	aggcaaaatg	5880
ccgcaaaaaa	gggaataagg	gcgacacgga	aatgttgaat	actcatactc	ttcctttttc	5940

aatattattg aagcatttat cagggttatt gtctcatgag cggatacata tttgaatgta 6000

tttagaaaaa taaacaaata ggggttccgc gcacatttcc ccgaaaagtg ccacctg 6057

<210> 8  
 <211> 235  
 <212> PRT  
 <213> human

<400> 8

Met Lys Trp Ser Trp Val Ile Leu Phe Leu Leu Ser Val Thr Ala Gly  
 1 5 10 15

Val His Ser Gln Val Gln Val Gln Gln Ser Gly Ala Glu Leu Ala Arg  
 20 25 30

Pro Trp Ala Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Asn Phe  
 35 40 45

Asn Ser Tyr Trp Met Gln Trp Val Lys Gln Arg Pro Gly Gln Gly Leu  
 50 55 60

Glu Trp Ile Gly Ala Ile Tyr Pro Gly Asp Gly Asp Thr Ser Tyr Thr  
 65 70 75 80

Gln Lys Phe Arg Gly Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser  
 85 90 95

Thr Ala Tyr Met Gln Leu Ser Ser Leu Ala Ser Glu Asp Ser Ala Val  
 100 105 110

Tyr Tyr Cys Ala Arg Arg Thr Val Gly Gly Tyr Phe Asp Tyr Trp Gly  
 115 120 125

Gln Gly Thr Thr Leu Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser  
 130 135 140

Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala  
 145 150 155 160

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val  
 165 170 175

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala  
 180 185 190

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val  
 195 200 205

Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His  
 210 215 220

Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val  
 225 230 235

<210> 9  
 <211> 2026  
 <212> DNA  
 <213> human

<400> 9  
 ggatcctcta gattgagctt tctggggcag gccaggcctg accttggtg ggggcagggg 60  
 gggggctaag gtgacgcagg tggcgccagc caggtgcaca cccaatgcc atgagcccag 120  
 aactggacc ctgcatggac catcgcgat agacaagaac cgaggggcct ctgcgccctg 180  
 ggcccagctc tgtccacac cgcggtcaca tggcaccacc tctcttgag cctccaccaa 240  
 gggcccatcc gtcttcccc tggcgccctg ctccaggagc acctccgaga gcacagccgc 300  
 cctgggctgc ctggtcaagg actacttccc cgaaccggtg acggtgtcgt ggaactcagg 360  
 cgccctgacc agcggcgtgc acaccttccc ggctgtccta cagtctcag gactctactc 420  
 cctcagcagc gtggtgaccg tgccctccag caacttggc acccagacct acacctgcaa 480  
 cgtagatcac aagcccagca acaccaaggt ggacaagaca gttggtgaga ggccagctca 540  
 gggagggagg gtgtctgctg gaagccaggc tcagccctcc tgcttgagc cccccggct 600  
 gtgcagcccc agcccagggc agcaaggcag gcccactctg tctctcacc cggaggcctc 660  
 tgcccgcccc actcatgctc agggagaggg tcttctggct ttttccacca ggctccaggg 720  
 aggcacaggc tgggtgcccc taccacaggc cttcacaca caggggcagg tgcttggtc 780  
 agacctgcca aaagccatat ccgggaggac cctgcccctg acctaagccg accccaaagg 840  
 ccaaactgtc cactccctca gctcggacac cttctctct cccagatccg agtaactccc 900  
 aatcttctct ctgcagagcg caaatgttgt gtgagtgcc caccgtgccc aggtaagcca 960  
 gcccaggcct cgccctccag ctcaaggcgg gacaggtgcc ctagagtagc ctgcatccag 1020  
 ggacaggccc cagctgggtg ctgacacgtc cacctccatc tcttctcag caccacctgt 1080  
 ggcaggaccg tcagtcttcc tcttcccccc aaaacccaag gacaccctca tgatctcccg 1140  
 gacccctgag gtcacgtgcc tgggtggtgga cgtgagccag gaagaccccg aggtccagtt 1200  
 caactggtac gtggatggcg tggaggtgca taatgccaa acaaagccgc gggaggagca 1260

gttcaacagc acgtaccgtg tggtcagcgt cctcaccgtc ctgcaccagg actggctgaa 1320  
 cggcaaggag tacaagtgca aggtctccaa caaaggcctc cgtcctcca tcgagaaaac 1380  
 catctccaaa gccaaagggtg ggaccacagg ggtgcgaggg ccacatggac agaggtcagc 1440  
 tcggcccacc ctctgccctg ggagtgaccg ctgtgccaac ctctgtccct acagggcagc 1500  
 cccgagagcc acaggtgtac accctgcccc catcccagga ggagatgacc aagaaccagg 1560  
 tcagcctgac ctgcctgggtc aaaggcttct accccagcga catcgccgtg gagtgggaga 1620  
 gcaatgggca gccggagaac aactacaaga ccacgcctcc cgtgctggac tccgacggct 1680  
 ccttcttcct ctacagcagg ctaaccgtgg acaagagcag gtggcaggag gggaaatgtct 1740  
 tctcatgctc cgtgatgcat gaggctctgc acaaccacta cacacagaag agcctctccc 1800  
 tgtctctggg taaatgagtg ccagggccgg caagcccccg ctccccgggc tctcggggtc 1860  
 gcgcgaggat gcttggcacg taccctgtct acatacttcc caggcaccca gcatggaaat 1920  
 aaagcaccca ccactgcctt gggcccctgt gagactgtga tggttctttc cacgggtcag 1980  
 gccgagtctg aggctgagt gacatgagga attcagatct ggatcc 2026

<210> 10  
 <211> 119  
 <212> PRT  
 <213> murine

<400> 10

Gln Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Ala Arg Pro Gly Ala  
 1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Arg Tyr  
 20 25 30

Thr Met His Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile  
 35 40 45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Phe  
 50 55 60

Lys Asp Lys Ala Thr Leu Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr  
 65 70 75 80

Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys  
 85 90 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly  
                   100                  105                  110

Thr Thr Leu Thr Val Ser Ser  
                   115

<210> 11  
 <211> 119  
 <212> PRT  
 <213> artificial sequence

<220>  
 <223> de-immunized heavy chain variable region

<400> 11

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala  
   1                  5                  10                  15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Ala Thr Arg Tyr  
                   20                  25                  30

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile  
                   35                  40                  45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Ala Gln Lys Phe  
                   50                  55                  60

Gln Asp Arg Val Thr Ile Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr  
   65                  70                  75                  80

Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys  
                   85                  90                  95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly  
                   100                  105                  110

Thr Thr Val Thr Val Ser Ser  
                   115

<210> 12  
 <211> 119  
 <212> PRT  
 <213> artificial sequence

<220>  
 <223> de-immunized heavy chain variable region

<400> 12

15/41

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala  
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Ala Thr Arg Tyr  
20 25 30

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile  
35 40 45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Ala Asp Ser Val  
50 55 60

Lys Gly Arg Phe Thr Ile Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr  
65 70 75 80

Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys  
85 90 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly  
100 105 110

Thr Thr Val Thr Val Ser Ser  
115

<210> 13  
<211> 119  
<212> PRT  
<213> artificial sequence

<220>  
<223> de-immunized heavy chain variable region

<400> 13

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala  
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Ala Thr Arg Tyr  
20 25 30

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile  
35 40 45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Phe  
50 55 60

Lys Asp Arg Val Thr Ile Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr  
65 70 75 80

Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys  
                             85                            90                            95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly  
                             100                            105                            110

Thr Thr Val Thr Val Ser Ser  
                             115

<210> 14  
 <211> 119  
 <212> PRT  
 <213> artificial sequence

<220>  
 <223> de-immunized heavy chain variable region

<400> 14

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala  
 1                            5                            10                            15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Ala Thr Arg Tyr  
                             20                            25                            30

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile  
                             35                            40                            45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Val  
                             50                            55                            60

Lys Asp Arg Phe Thr Ile Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr  
 65                            70                            75                            80

Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys  
                             85                            90                            95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly  
                             100                            105                            110

Thr Thr Val Thr Val Ser Ser  
                             115

<210> 15  
 <211> 119  
 <212> PRT  
 <213> artificial sequence



&lt;220&gt;

&lt;223&gt; de-immunized heavy chain variable region

&lt;400&gt; 15

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala  
 1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Arg Tyr  
 20 25 30

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile  
 35 40 45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Phe  
 50 55 60

Lys Asp Arg Val Thr Ile Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr  
 65 70 75 80

Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys  
 85 90 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly  
 100 105 110

Thr Thr Val Thr Val Ser Ser  
 115

&lt;210&gt; 16

&lt;211&gt; 119

&lt;212&gt; PRT

&lt;213&gt; artificial sequence

&lt;220&gt;

&lt;223&gt; de-immunized heavy chain variable region

&lt;400&gt; 16

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala  
 1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Arg Tyr  
 20 25 30

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile  
 35 40 45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Ala Gln Lys Phe  
 50 55 60

Gln Asp Arg Val Thr Ile Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr  
 65 70 75 80

Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys  
 85 90 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly  
 100 105 110

Thr Thr Val Thr Val Ser Ser  
 115

<210> 17  
 <211> 119  
 <212> PRT  
 <213> artificial sequence

<220>  
 <223> de-immunized heavy chain variable region

<400> 17

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala  
 1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Arg Tyr  
 20 25 30

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile  
 35 40 45

Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln Lys Val  
 50 55 60

Lys Asp Arg Phe Thr Ile Thr Thr Asp Lys Ser Ser Ser Thr Ala Tyr  
 65 70 75 80

Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys  
 85 90 95

Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly Gln Gly  
 100 105 110

Thr Thr Val Thr Val Ser Ser  
115

<210> 18  
<211> 106  
<212> PRT  
<213> murine

<400> 18

Gln Ile Val Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly  
1 5 10 15

Glu Lys Val Thr Met Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met  
20 25 30

Asn Trp Tyr Gln Gln Lys Ser Gly Thr Ser Pro Lys Arg Trp Ile Tyr  
35 40 45

Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ala His Phe Arg Gly Ser  
50 55 60

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Gly Met Glu Ala Glu  
65 70 75 80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Phe Thr  
85 90 95

Phe Gly Ser Gly Thr Lys Leu Glu Ile Asn  
100 105

<210> 19  
<211> 106  
<212> PRT  
<213> artificial sequence

<220>  
<223> de-immunized light chain variable region

<400> 19

Gln Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly  
1 5 10 15

Glu Arg Ala Thr Leu Thr Cys Ser Ala Ser Ser Ser Ala Ser Tyr Met  
20 25 30

Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Arg Trp Ile Tyr  
35 40 45

Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly Ser  
 50 55 60

Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Asn Ser Leu Glu Ala Glu  
 65 70 75 80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Phe Thr  
 85 90 95

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys  
 100 105

<210> 20

<211> 106

<212> PRT

<213> artificial sequence

<220>

<223> de-immunized light chain variable region

<400> 20

Gln Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly  
 1 5 10 15

Glu Arg Ala Thr Leu Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met  
 20 25 30

Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Arg Trp Ile Tyr  
 35 40 45

Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly Ser  
 50 55 60

Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Asn Ser Leu Glu Ala Glu  
 65 70 75 80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Phe Thr  
 85 90 95

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys  
 100 105

<210> 21

<211> 819

<212> DNA

<213> artificial sequence

&lt;220&gt;

&lt;223&gt; de-immunized VH expression cassette

&lt;400&gt; 21

```

aagcttatga atatgcaa at cctctgaatc tacatggtaa atataggttt gtctatacca      60
caaacagaaa aacatgagat cacagttgtc tctacagtta ctgagcacac aggacctcac      120
catgggatgg agctgtatca tcctcttctt ggtagcaaca gctacaggta aggggctcac      180
agtagcaggc ttgaggtctg gacatatata tgggtgacaa tgacatccac tttgcctttc      240
tctccacagg tgtccactcc caggtccagc tggtagagtc tggggctgaa gtcaagaaac      300
ctggggcctc agtgaagggtg tcctgcaagg cttctggcta cacgggtact aggtacacga      360
tgcactgggt aagacaggcg cctggacaag gtttggaatg gattggatac attaacccta      420
gccatggata tactaattac gctcagaagt tccaggacag ggtcacaatc actacagaca      480
aatcttccag cacagcctac ttgcaaatac acagcctgaa aactgaggac accgcagtct      540
attactgtgc aagatattat gatgatcatt actgtctcga ctactggggc caaggcacca      600
ctgtgacagt ctctcaggt gagtccttac aacctctctc ttctattcag cttaaataga      660
ttttactgca tttgttgggg gggaaatgtg tgtatctgaa tttcagggtc tgaaggacta      720
gggacacctt gggagtcaga aagggtcatt gggagcccgg gctgatgcag acagacatcc      780
tcagctccca gacttcattg ccagagattt ataggatcc      819

```

&lt;210&gt; 22

&lt;211&gt; 15

&lt;212&gt; PRT

&lt;213&gt; artificial sequence

&lt;220&gt;

&lt;223&gt; signal protein

&lt;400&gt; 22

```

Met Gly Trp Ser Cys Ile Ile Leu Phe Leu Val Ala Thr Ala Thr
1           5           10           15

```

&lt;210&gt; 23

&lt;211&gt; 617

&lt;212&gt; DNA

&lt;213&gt; artificial sequence

&lt;220&gt;

&lt;223&gt; de-immunized VK expression cassette

&lt;400&gt; 23

```

aagcttatga atatgcaa at cctctgaatc tacatggtaa atataggttt gtctatacca      60
caaacagaaa aacatgagat cacagttctc tctacagtta ctgagcacac aggacctcac      120

```

```

catgggatgg agctgtatca tcctcttctt ggtagcaaca gctacaggta agggggtcac    180
agtagcaggc ttgaggtctg gacatatata tgggtgacaa tgacatccac tttgcctttc    240
tctccacagg tgtccactcc caaattgttc tcacccagtc tccagcaacc ctctctcttt    300
ctccagggga acgcgccacc ttgacatgca gtgccagctc aagtgcaagt tacatgaact    360
ggtaccagca gaagcccggc aaagctccca aaagatggat ttatgacaca tcaaaactgg    420
cttctggagt accgtctcgc ttcagtggca gtgggtctgg gaccgattac tctctcacia    480
tcaatagtct ggaagctgaa gatgccgcaa cttattactg ccagcagtgg tcaagtaacc    540
cattcacgtt cggacaaggc acaaagggtg aaatcaaacg tgagtagaat ttaaactttg    600
cttctcagt  tggatcc                                         617

```

```

<210> 24
<211> 15
<212> PRT
<213> artificial sequence

```

```

<220>
<223> signal protein

```

```

<400> 24

```

```

Met Gly Trp Ser Cys Ile Ile Leu Phe Leu Val Ala Thr Ala Thr
1           5           10          15

```

```

<210> 25
<211> 467
<212> PRT
<213> murine

```

```

<400> 25

```

```

Met Glu Arg His Trp Ile Phe Leu Leu Leu Leu Ser Val Thr Ala Gly
1           5           10          15

```

```

Val His Ser Gln Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Ala Arg
          20          25          30

```

```

Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Tyr Thr Phe Thr
          35          40          45

```

```

Arg Tyr Thr Met His Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu
          50          55          60

```

```

Trp Ile Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Asn Gln
          65          70          75          80

```

Lys Phe Lys Asp Lys Ala Thr Leu Thr Thr Asp Lys Ser Ser Ser Thr  
85 90 95

Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr  
100 105 110

Tyr Cys Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp Gly  
115 120 125

Gln Gly Thr Thr Leu Thr Val Ser Ser Ala Lys Thr Thr Ala Pro Ser  
130 135 140

Val Tyr Pro Leu Ala Pro Val Cys Gly Asp Thr Thr Gly Ser Ser Val  
145 150 155 160

Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Leu  
165 170 175

Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala  
180 185 190

Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Thr  
195 200 205

Ser Ser Thr Trp Pro Ser Gln Ser Ile Thr Cys Asn Val Ala His Pro  
210 215 220

Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Glu Pro Arg Gly Pro Thr  
225 230 235 240

Ile Lys Pro Cys Pro Pro Cys Lys Cys Pro Ala Pro Asn Leu Leu Gly  
245 250 255

Gly Pro Ser Val Phe Ile Phe Pro Pro Lys Ile Lys Asp Val Leu Met  
260 265 270

Ile Ser Leu Ser Pro Ile Val Thr Cys Val Val Val Asp Val Ser Glu  
275 280 285

Asp Asp Pro Asp Val Gln Ile Ser Trp Phe Val Asn Asn Val Glu Val  
290 295 300

His Thr Ala Gln Thr Gln Thr His Arg Glu Asp Tyr Asn Ser Thr Leu  
305 310 315 320

Arg Val Val Ser Ala Leu Pro Ile Gln His Gln Asp Trp Met Ser Gly  
                   325                                  330                                  335

Lys Glu Phe Lys Cys Lys Val Asn Asn Lys Asp Leu Pro Ala Pro Ile  
                   340                                  345                                  350

Glu Arg Thr Ile Ser Lys Pro Lys Gly Ser Val Arg Ala Pro Gln Val  
                   355                                  360                                  365

Tyr Val Leu Pro Pro Pro Glu Glu Glu Met Thr Lys Lys Gln Val Thr  
                   370                                  375                                  380

Leu Thr Cys Met Val Thr Asp Phe Met Pro Glu Asp Ile Tyr Val Glu  
                   385                                  390                                  395                                  400

Trp Thr Asn Asn Gly Lys Thr Glu Leu Asn Tyr Lys Asn Thr Glu Pro  
                                   405                                  410                                  415

Val Leu Asp Ser Asp Gly Ser Tyr Phe Met Tyr Ser Lys Leu Arg Val  
                   420                                  425                                  430

Glu Lys Lys Asn Trp Val Glu Arg Asn Ser Tyr Ser Cys Ser Val Val  
                   435                                  440                                  445

His Glu Gly Leu His Asn His His Thr Thr Lys Ser Phe Ser Arg Thr  
                   450                                  455                                  460

Pro Gly Lys  
                   465

<210> 26  
 <211> 1570  
 <212> DNA  
 <213> murine

<400> 26  
 gaattccct ctccacagac actgaaaact ctgactcaac atggaaaggc ctggatcttt 60  
 ctactcctgt tgctagtaac tgcaggtgtc cactcccagg tccagctgca gcagtctggg 120  
 gctgaactgg caagacctgg ggcctcagtg aagatgtcct gcaaggcttc tggctacacc 180  
 tttactaggt acacgatgca ctgggtaaaa cagaggcctg gacaggggtct ggaatggatt 240  
 ggatacatta atcctagccg tggttatact taattacaat cagaagttca aggacaaggc 300  
 cacattgact acagacaaat cctccagcac agcctacatg caactgagca gcctgacatc 360  
 tgaggactct gcagtctatt actgtgcaag atattatgat gatcattact gccttgacta 420



```

ctggggccaa ggcaccactc tcacagtctc ctgagccaaa acaacagccc catcgggtcta 480
tccactggcc cctgtgtgtg gagatacaac tggctcctcg gtgactctag gatgcctggt 540
caagggttat ttccctgagc cagtgaacct gacctggaac tctggatccc tgtccagtgg 600
tgtgcacacc ttcccagctg tcctgcagtc tgacctctac accctcagca gctcagtgaac 660
tgtaacctcg agcacctggc ccagccagtc catcacctgc aatgtggccc acccggcaag 720
cagcaccaag gtggacaaga aaattgagcc cagagggccc acaatcaagc cctgtcctcc 780
atgcaaatgc ccagcaccta acctcttggg tggaccatcc gtcttcatct tccctccaaa 840
gatcaaggat gtactcatga tctccctgag ccccatagtc acatgtgtgg tgggtggatgt 900
gagcgaggat gaccagatg tccagatcag ctggtttgtg aacaacgtgg aagtacacac 960
agctcagaca caaaccata gagaggatta caacagtact ctccgggtgg tcagtgcctt 1020
cccatccag caccaggact ggatgagtgg caaggagttc aaatgcaagg tcaacaacaa 1080
agacctcca gcgcccacg agagaacct ctcaaaacc aaagggtcag taagagctcc 1140
acaggtatat gtcttgctc caccagaaga agagatgact aagaaacagg tcactctgac 1200
ctgcatggtc acagacttca tgctgaaga catttacgtg gaggggacca acaacgggaa 1260
aacagagcta aactacaaga acactgaacc agtcctggac tctgatggtt cttacttcat 1320
gtacagcaag ctgagagtgg aaaagaagaa ctgggtggaa agaaatagct actcctgttc 1380
agtgggtccac gaggggtctg acaatcacca cagactaag agcttctccc ggactccggg 1440
taaagtagct cagcaccac aaaactctca ggtccaaaga gacaccaca ctcatctcca 1500
tgcttccctt gtataaataa agcaccagc aatgcctggg accatgtaaa aaaaaaaaaa 1560
aaaggaattc 1570

```

```

<210> 27
<211> 235
<212> PRT
<213> murine

```

```

<400> 27

```

```

Met Asp Phe Gln Val Gln Ile Phe Ser Phe Leu Leu Ile Ser Ala Ser
1           5           10           15

```

```

Val Ile Ile Ser Arg Gly Gln Ile Val Leu Thr Gln Ser Pro Ala Ile
20           25           30

```

```

Met Ser Ala Ser Pro Gly Glu Lys Val Thr Met Thr Cys Ser Ala Ser
35           40           45

```

Ser Ser Val Ser Tyr Met Asn Trp Tyr Gln Gln Lys Ser Gly Thr Ser  
50 55 60

Pro Lys Arg Trp Ile Tyr Asp Thr Ser Lys Leu Ala Ser Gly Val Pro  
65 70 75 80

Ala His Phe Arg Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile  
85 90 95

Ser Gly Met Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp  
100 105 110

Ser Ser Asn Pro Phe Thr Phe Gly Ser Gly Thr Lys Leu Glu Ile Asn  
115 120 125

Arg Ala Asp Thr Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu  
130 135 140

Gln Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe  
145 150 155 160

Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg  
165 170 175

Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser  
180 185 190

Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu  
195 200 205

Arg His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser  
210 215 220

Pro Ile Val Lys Ser Phe Asn Arg Asn Glu Cys  
225 230 235

<210> 28  
<211> 943  
<212> DNA  
<213> murine

<400> 28  
gaattcccaa agacaaaatg gatttttcaag tgcagatttt cagcttctctg ctaatcagtg 60  
cctcagtcac aatatccaga ggacaaattg ttctcaccoca gtctccagca atcatgtctg 120  
catctccagg ggagaagggtc accatgacct gcagtgccag ctcaagtgtgta agttacatga 180

```

actggtacca gcagaagtca ggcacctccc ccaaagatg gatttatgac acatccaaac 240
tggcttctgg agtccctgct cacttcaggg gcagtgggtc tgggacctct tactctctca 300
caatcagcgg catggaggct gaagatgctg ccacttatta ctgccagcag tggagtagta 360
accattcac gttcggctcg gggacaaagt tggaaataaa cgggctgat actgcaccaa 420
ctgtatccat cttccacca tccagtgagc agttaacatc tggagggtgcc tcagtcgtgt 480
gcttcttgaa caacttctac ccaaagaca tcaatgtcaa gtggaagatt gatggcagtg 540
aacgacaaaa tggcgtcctg aacagttgga ctgatcagga cagcaaagac agcacctaca 600
gcatgagcag caccctcacg ttgaccaagg acgagtatga acgacataac agctatacct 660
gtgaggccac tcacaagaca tcaacttcac ccattgtcaa gagcttcaac aggaatgagt 720
gttagagaca aaggctctga gacgccacca ccagctccca gctccatcct atcttccctt 780
ctaaggcttt ggaggcttcc ccacaagcgc ttaccactgt tgcggtgctc taaacctcct 840
cccacctcct tctcctctc ctccttttcc ttggctttta tcatgcta atttgcagaa 900
aatattcaat aaagtgagtc tttgccttga aaaaaaaaaa aaa 943

```

<210> 29  
 <211> 123  
 <212> PRT  
 <213> murine

<400> 29

Gly Val His Ser Gln Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Ala  
 1 5 10 15

Arg Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr  
 20 25 30

Phe Thr Arg Tyr Thr Met His Trp Val Lys Gln Arg Pro Gly Gln Gly  
 35 40 45

Leu Glu Trp Ile Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr  
 50 55 60

Asn Gln Lys Phe Lys Asp Lys Ala Thr Leu Thr Thr Asp Lys Ser Ser  
 65 70 75 80

Ser Thr Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala  
 85 90 95

Val Tyr Tyr Cys Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr  
 100 105 110

Trp Gly Gln Gly Thr Thr Leu Thr Val Ser Ser  
 115 120

<210> 30  
 <211> 110  
 <212> PRT  
 <213> murine

<400> 30

Gly Val His Ser Gln Ile Val Leu Thr Gln Ser Pro Ala Ile Met Ser  
 1 5 10 15

Ala Ser Pro Gly Glu Lys Val Thr Met Thr Cys Ser Ala Ser Ser Ser  
 20 25 30

Val Ser Tyr Met Asn Trp Tyr Gln Gln Lys Ser Gly Thr Ser Pro Lys  
 35 40 45

Arg Trp Ile Tyr Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ala His  
 50 55 60

Phe Arg Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Gly  
 65 70 75 80

Met Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser  
 85 90 95

Asn Pro Phe Thr Phe Gly Ser Gly Thr Lys Leu Glu Ile Lys  
 100 105 110

<210> 31  
 <211> 12  
 <212> PRT  
 <213> human

<400> 31

Glu Ser Lys Tyr Gly Pro Pro Cys Pro Ser Cys Pro  
 1 5 10

<210> 32  
 <211> 110  
 <212> PRT  
 <213> human

&lt;400&gt; 32

Ala Pro Glu Phe Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys  
 1 5 10 15

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val  
 20 25 30

Val Val Asp Val Ser Gln Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr  
 35 40 45

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu  
 50 55 60

Gln Phe Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His  
 65 70 75 80

Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys  
 85 90 95

Gly Leu Pro Ser Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys  
 100 105 110

&lt;210&gt; 33

&lt;211&gt; 107

&lt;212&gt; PRT

&lt;213&gt; human

&lt;400&gt; 33

Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Gln Glu  
 1 5 10 15

Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe  
 20 25 30

Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu  
 35 40 45

Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe  
 50 55 60

Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys Ser Arg Trp Gln Glu Gly  
 65 70 75 80

Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr  
 85 90 95

Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly Lys  
 100 105

<210> 34  
 <211> 12  
 <212> PRT  
 <213> human

<400> 34

Glu Arg Lys Cys Cys Val Glu Cys Pro Pro Cys Pro  
 1 5 10

<210> 35  
 <211> 109  
 <212> PRT  
 <213> human

<400> 35

Ala Pro Pro Val Ala Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro  
 1 5 10 15

Lys Asp Thr Leu Asn Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val  
 20 25 30

Val Asp Val Ser Gln Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val  
 35 40 45

Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln  
 50 55 60

Phe Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln  
 65 70 75 80

Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly  
 85 90 95

Leu Pro Ser Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys  
 100 105

<210> 36  
 <211> 107  
 <212> PRT  
 <213> human

<400> 36

Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Gln Glu  
 1 5 10 15

Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe  
 20 25 30

Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu  
 35 40 45

Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe  
 50 55 60

Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys Ser Arg Trp Gln Glu Gly  
 65 70 75 80

Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr  
 85 90 95

Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly Lys  
 100 105

<210> 37  
 <211> 43  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> oligonucleotide

<400> 37  
 gaagtcaaga aacctggggc ctcaagtgaag gtgtcctgca agg

43

<210> 38  
 <211> 47  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> oligonucleotide

<400> 38  
 gccccagggtt tcttgacttc agccccagac tgtaccagct ggacctg

47

<210> 39  
 <211> 31  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> oligonucleotide

<400> 39  
 tgggtaagac aggcgcctgg acaaggtttg g 31

<210> 40  
 <211> 29  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> oligonucleotide

<400> 40  
 gtccaggcgc ctgtcttacc cagtgcac 29

<210> 41  
 <211> 48  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> oligonucleotide

<400> 41  
 aggcgcctgt cttaccagc gcacgtgta cctagtagcc gtgtagcc 48

<210> 42  
 <211> 43  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> oligonucleotide

<400> 42  
 caatcagaag ttcaaggaca gggtcacaat cactacagac aaa 43

<210> 43  
 <211> 43  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> oligonucleotide

<400> 43  
 cgctcagaag ttccaggaca gggtcacaat cactacagac aaa 43

<210> 44  
 <211> 43  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> oligonucleotide



<400> 44  
 cgctgacagt gtcaaggga ggttcacaat cactacagac aaa 43

<210> 45  
 <211> 43  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> oligonucleotide

<400> 45  
 caatcagaag gtcaaggaca ggttcacaat cactacagac aaa 43

<210> 46  
 <211> 37  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> oligonucleotide

<400> 46  
 gtccttgaac ttctgattgt aattagtata tccacgg 37

<210> 47  
 <211> 37  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> oligonucleotide

<400> 47  
 gtccttgaac ttctgagcgt aattagtata tccacgg 37

<210> 48  
 <211> 37  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> oligonucleotide

<400> 48  
 gcccttgaca ctgtcagcgt aattagtata tccacgg 37

<210> 49  
 <211> 37  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> oligonucleotide

<400> 49  
gtccttgacc ttctgattgt aattagtata tccacgg 37

<210> 50  
<211> 35  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 50  
agcctgaaaa ctgaggacac cgcagtctat tactg 35

<210> 51  
<211> 42  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 51  
gtcctcagtt ttcaggctgt tcatttgcaa gtaggctgtg ct 42

<210> 52  
<211> 30  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 52  
ccaaggcacc actgtgacag tctcctcagg 30

<210> 53  
<211> 30  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 53  
cctgaggaga ctgtcacagt ggtgccttgg 30

<210> 54  
<211> 24  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 54  
ggtgtccact cccaggtcca gctg 24

<210> 55  
<211> 29  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 55  
cagctggacc tgggagtgga cacctgtgg 29

<210> 56  
<211> 37  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 56  
gcatgttgac cctgacgcaa gcttatgaat atgcaaa 37

<210> 57  
<211> 36  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 57  
gcgatagctg gactgaatgg atcctataaa tctctg 36

<210> 58  
<211> 45  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 58  
ccctctctct ttctccaggg gaacgcgcca ccttgacatg cagtg 45

<210> 59  
<211> 36  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 59  
cctggagaaa gagagagggt tgctggagac tgggtg 36

<210> 60  
<211> 48  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 60  
catgaactgg taccagcaga agcccggcaa agctcccaa agatggat 48

<210> 61  
<211> 38  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 61  
cgggcttctg ctggtaccag ttcatgtaac ttacactt 38

<210> 62  
<211> 38  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 62  
cttctgctgg taccagttca tgtaacttgc acttgagc 38

<210> 63  
<211> 49  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 63  
gggtctggga ccgattactc tctcacaatc aatagtctgg aagctgaag 49

<210> 64  
<211> 47  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 64  
gtaatcggtc ccagaccac tgccactgaa gcgagacggt actccag 47

<210> 65  
<211> 38  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 65  
ttcacgttcg gacaaggtag aaaggtggaa atcaaacg 38

<210> 66  
<211> 38  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 66  
ctttgtacct tgtccgaacg tgaatgggtt acttgacc 38

<210> 67  
<211> 21  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 67  
gcggatccag tcgacgaagc a 21

<210> 68  
<211> 45  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 68  
ctgaatggat ccaactgagg aagcaaagtt taaattctac tcacg 45

<210> 69  
<211> 28  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 69  
caaattgttc tcaccagtc tccagcaa 28

<210> 70  
<211> 32  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 70  
ttgctggaga ctgggtgaga acaatttggg ag 32

<210> 71  
<211> 41  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 71  
tggagactgg gtgagaacaa tttgggagtg gacacctgtg g 41

<210> 72  
<211> 36  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 72  
agagagggtt gctggagact gggtgagaac aatttg 36

<210> 73  
<211> 37  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 73  
gcatgttgac cctgacgcaa gcttatgaat atgcaaa 37

<210> 74  
<211> 36  
<212> DNA  
<213> artificial sequence

<220>  
<223> oligonucleotide

<400> 74  
gcgatagctg gactgaatgg atccaactga ggaagc

36

<210> 75  
<211> 122  
<212> PRT  
<213> artificial sequence

<220>  
<223> de-immunized OKT3 VH

<400> 75

Val Ser Thr Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys  
1 5 10 15

Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Ala  
20 25 30

Thr Arg Tyr Thr Met His Trp Tyr Arg Gln Ala Pro Gly Gln Gly Leu  
35 40 45

Glu Trp Ile Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr Ala  
50 55 60

Gln Lys Phe Gln Gln Arg Val Thr Ile Thr Thr Asp Lys Ser Ser Ser  
65 70 75 80

Thr Ala Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val  
85 90 95

Tyr Tyr Cys Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr Trp  
100 105 110

Gly Gln Gly Thr Thr Val Thr Val Ser Gly  
115 120

<210> 76  
<211> 110  
<212> PRT  
<213> artificial sequence

<220>  
<223> de-immunized OKT3 VK

<400> 76

Gly Val His Ser Gln Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser  
1 5 10 15

Leu Ser Pro Gly Glu Arg Ala Thr Leu Thr Cys Ser Ala Ser Ser Ser  
                   20                                  25                                  30

Ala Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys  
           35                                  40                                  45

Arg Trp Ile Tyr Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ser Arg  
       50                                  55                                  60

Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Asn Ser  
   65                                  70                                  75                                  80

Leu Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser  
                   85                                  90                                  95

Asn Pro Phe Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys  
                   100                                  105                                  110

<210> 77  
 <211> 21  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> primer

<400> 77  
 ttgtgagcgg ataacaattt c 21

<210> 78  
 <211> 23  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> primer

<400> 78  
 gttttcccag tcacgacgtt gta 23

<210> 79  
 <211> 30  
 <212> DNA  
 <213> artificial sequence

<220>  
 <223> primer

<400> 79  
 cttgcagcct ccaccaaggg cccatccgtc 30



<210> 80  
<211> 25  
<212> DNA  
<213> artificial sequence

<220>  
<223> primer

<400> 80  
cccttggtgg aggctgcaag agagg

25

<210> 81  
<211> 33  
<212> DNA  
<213> artificial sequence

<220>  
<223> primer

<400> 81  
gagcctctcc ctgtctctgg gtaaagtgt gcc

33

<210> 82  
<211> 35  
<212> DNA  
<213> artificial sequence

<220>  
<223> primer

<400> 82  
tcattttaccc agagacaggg agaggctctt ctgtg

35

<210> 83  
<211> 35  
<212> DNA  
<213> artificial sequence

<220>  
<223> primer

<400> 83  
taccggggga tccagatctg aattcctcat gtcac

35